

Thyrotoxicosis formation due to functioning metastatic follicular thyroid cancer

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Abstract

Thyrotoxicosis is a common condition, which is associated with excess circulating thyroid hormones. Rarely, thyrotoxicosis may develop due to metastatic thyroid carcinoma. Most of patients with functional thyroid cancer metastases have normal thyroxine (T4) concentrations with high serum triiodothyronine (T3-thyrotoxicosis). Inappropriately suppressed Thyroid Stimulating Hormone (TSH) level with normal T4 level may be an indicator of T3 thyrotoxicosis. In this article, a thyrotoxicosis case, due to metastatic follicular thyroid cancer with a huge metastatic lesion was represented.

Keywords: Adenocarcinoma, Follicular, Thyrotoxicosis

Introduction

Thyrotoxicosis is a common condition associated with excess circulating thyroid hormones. It is important to identify the cause of the thyrotoxicosis to determine treatment approaches. Graves' disease, toxic multinodular goitre, thyroid nodule, thyroiditis, drugs (such as amiodarone, lithium, interferon α), β human chorionic gonadotrophin mediated hyperthyroidism (gestational hyperthyroidism, choriocarcinoma, hydatidiform mole) Struma ovary, non-autoimmune familial hyperthyroidism and Thyroid Stimulating Hormone (TSH) secreting pituitary adenoma are the important causes of thyrotoxicosis (1). Rarely, thyrotoxicosis may develop due to functioning of metastatic thyroid carcinoma (2, 3). In this case report we present a recognised case of thyrotoxicosis due to metastatic follicular thyroid cancer with a huge metastatic lesion.

Case Report

A 59-year-old female patient was admitted to our clinic with a painful, progressively enlarging mass around her right shoulder. The patient had elevated serum free triiodothyronine (free T3) normal serum free thyroxine (free T4) and low thyroid-stimulating hormone (TSH) Blood hormone levels of patient were shown in Table 1. The patient had thyroidectomy history 10 years ago due to multinodular goitre. She had not informed about her thyroid pathology. She had noticed a growing mass on the right shoulder for few years.

Three years ago, biopsy of the mass had been performed and pathological examination revealed the thyroid follicular cancer. The patient had not taken any medication. Moreover, the physical examination revealed that the patient has a right scapular mass. In addition, patient also has diabetes and getting intensive insulin therapy. Complete blood count was normal. The patient's elevated alkaline phosphatase and residual thyroid tissue (19X11mm) could be observed at the right side of the neck by ultrasonographic examination. The whole body was scanned using radioiodine imaging with I-131. The results showed an increased uptake in right scapular infero-lateral region (Figure 1). The MRI scan of the right shoulder showed a huge mass (150X111 mm), which includes bone and soft tissue (Figure-2a/2b). We planned metastatic mass excision, followed by the radioiodine ablation treatment, but the patient did not accept our therapy recommendations.

Table 1: Laboratory characteristics of the patient

	Normal range	Patient's result
TSH (uIU/ml)	0.270-4.2	0,01
Free T4 (ng/dL)	12-22	3.91
Free T3 (ng/dL)	3,9-6,7	18,57
Tiroglobulin (ng/mL)	1,4-78	500
Alkaline phosphatase (U/L)	40-150	259
Glucose (mg/dL)	70-109	196

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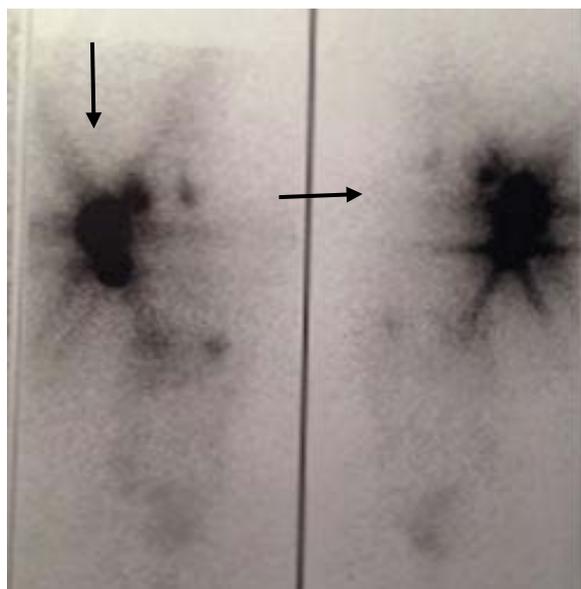


Figure 1: Whole body radioiodine imaging with I-131 showed increased uptake in the right scapular region

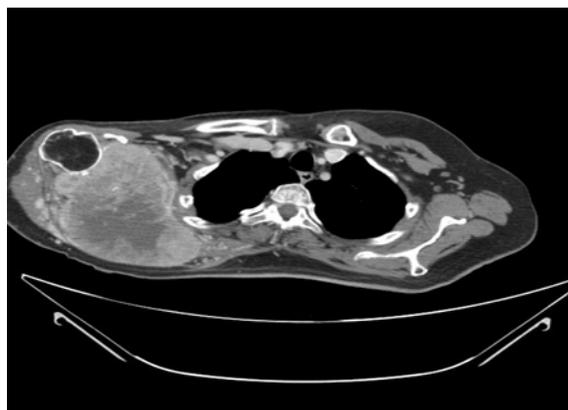


Figure 2a Magnetic Resonance Imaging (MRI) of the patient's right shoulder (Upward-Over)

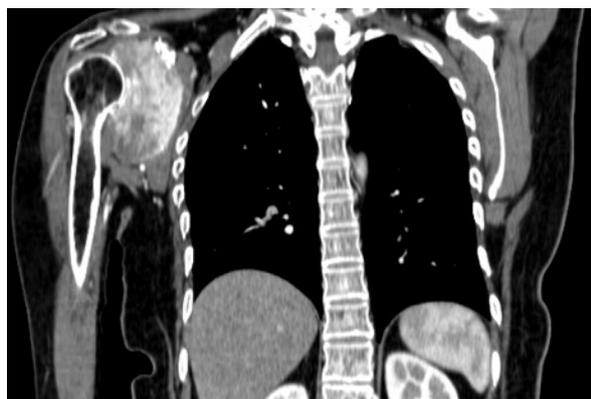


Figure 2b Magnetic Resonance Imaging (MRI) of the patient's right shoulder (Front)

Discussion

The formation of thyrotoxicosis due to functional thyroid cancer metastases is extremely rare, and is mostly caused by follicular cancer. Even so, hyper functioning papillary thyroid cancer has been documented (3,4). The patient had follicular cancer of the thyroid gland.

The functional metastases had been identified using whole body radioiodine imaging. of the patient with I-131. The results have shown an increased uptake in right scapular region. Previously, she was not informed or aware about her pathology specimen and was not treated with high dose radioactive iodine for thyroid cancer ablation. Small metastasis of follicular cancer of the thyroid may be asymptomatic, but bulky and extensive metastasis of cancer may lead to thyrotoxicosis.

The majority of patients with functional thyroid cancer metastases have had high serum triiodothyronine (T3) but normal thyroxine (T4) concentrations (T3-thyrotoxicosis). Patients who have thyrotoxicosis due to functioning metastatic thyroid carcinoma have predominantly T3 thyrotoxicosis (2).

Our patient's serum thyroglobulin and free T3 were elevated. She had normal free t4 and suppressed TSH level. Thyroid cancer patients especially follow up with thyroglobulin, free t4 and TSH levels but, in our opinion at least once a year, measuring free t3 may be helpful and give an opportunity to diagnose T3 thyrotoxicosis cases.

In patients who take TSH-suppressive thyroid hormone therapy with L-thyroxine after total thyroidectomy, the presence of hyper functioning metastases may not be readily occur. Gradual reduction or withdrawal of L-thyroxine therapy is necessary in order to recognize whether the thyrotoxicosis is caused by excessive exogenous levothyroxine or hyper functioning metastases. The mechanism is high activity of the type 1 and type 2 iodothyronine deiodinases in tumour tissues, ie. exogenously administered levothyroxine is converted to T3 (5).

A few of these patients have also had serum TSH-receptor stimulating antibodies, the presence of which would be expected to increase the hormonal synthetic capacity of the cancer (6). We did not measure TSH -receptor stimulating antibodies level due to technical failure.

Conclusion

In conclusion, 1- Follicular thyroid cancer can cause hyper functioning metastatic huge mass lesions. 2- Inappropriately suppressed TSH levels with normal T4 levels may be helpful to suspect T3 thyrotoxicosis.

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Ethical issues: All Authors declare that Originality of research/article etc... and ethical approval of research, and responsibilities of research against local ethics commission are under the Authors responsibilities. The study was conducted due to defined rules by the Local Ethics Commission guidelines and audits.

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